

EXCERPT

eMobility Smart Charging Study 2023



Product-market fit of variable tariffs and bidirectional charging

Smart Charging Study 2023

Objectives of the study

Initial situation:

- Smart charging comprises technical solutions for grid-supportive and bidirectional charging. Grid-supportive charging is realised through variable tariffs, among other things.
- Above all, smart charging offers advantages for energy suppliers and grid operators.
- It is unclear under what conditions EV drivers will use the technologies.

Question:

- Which variable tariff systems are convincing? Which use cases for bidirectional charging are convincing? What are the usage drivers and barriers from the customer's perspective?
- How big is the successfully addressable market?
- What are the prioritised levers for successful marketing?



Smart Charging Study 2023

Target group

Elevation:

- Target group: EV drivers (BEV only)
- Survey: CAWI
- Countries: DACH
- Recruitment: social media, access panel
- Interview duration: 15 - 20 min
- Field phase: November 2023

Sample:

- Total sample: N = 2,001
of which to the sections...
 - Variable tariffs (public): N = 1,045
 - Variable tariffs (at home): N = 919
 - V2G (public): N = 338
 - V2G (at home): N = 812
 - V2H: N = 814

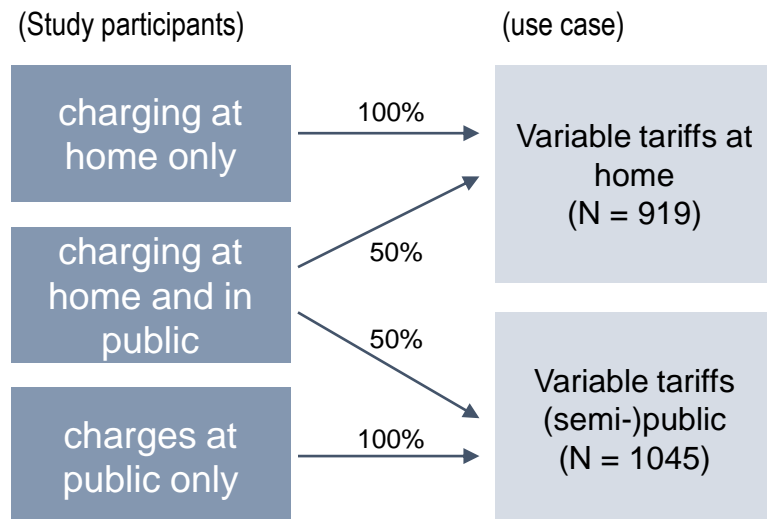


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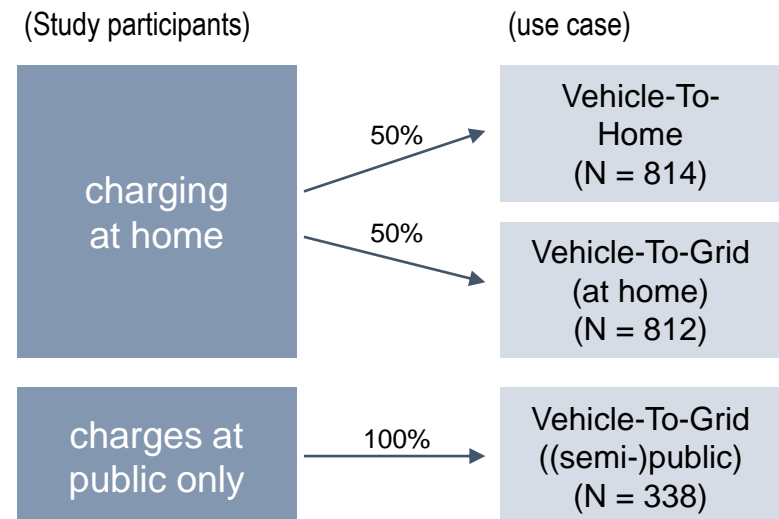
Set-up of the study

Depending on the charging locations used, the study participants were asked about various use cases relating to variable tariffs and bidirectional charging.

Study part 1: Variable tariffs



Study part 2: Bidirectional charging



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Dashboard for your own analyses

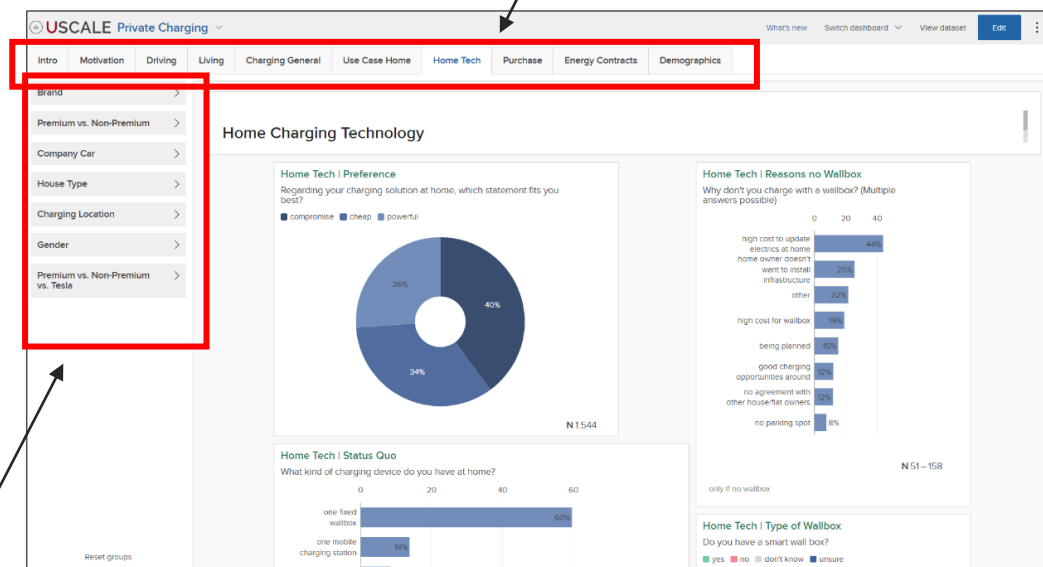
The study dashboard enables deep dives into individual brands, models and subgroups.

This document only shows selected splits.

Further splits between any sub-customer groups can be carried out in the associated dashboard.

To register, please contact kontakt@uscale.digital.

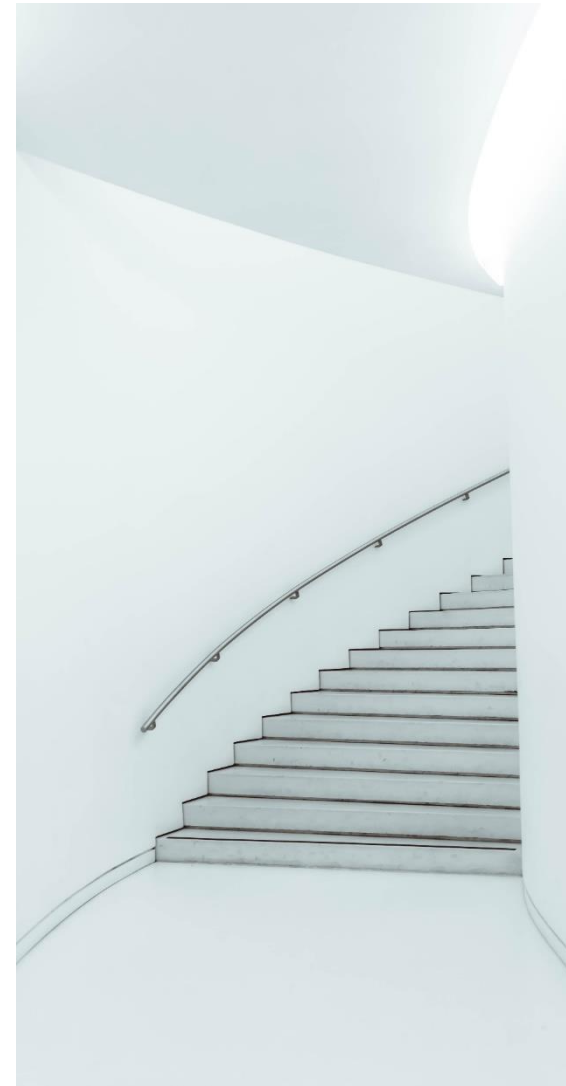
Subject areas



Filter options

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- (1) Management Summary
- ▶ (2) **Method: Evaluation of the product-market fit**
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- (7) DC charging at home



Preliminary remarks on the method

Determination of net value added

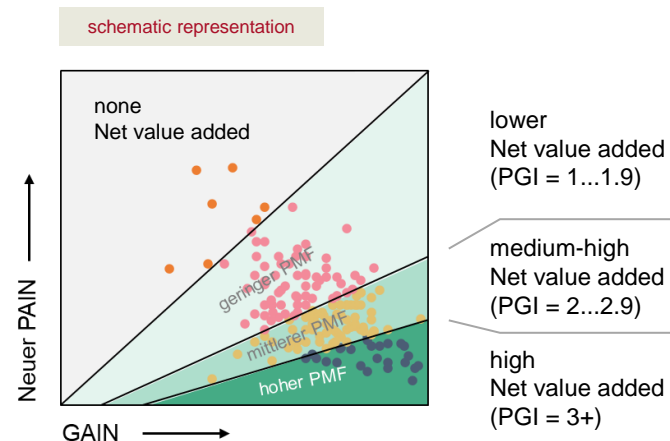
Determining the net value added for innovative services with the pain-gain test:

Every innovative service not only brings advantages, but also disadvantages for users. These can be the perceived effort involved in switching to a new solution or concerns that need to be overcome.

The most important prerequisite for the success of an innovative service is the ratio of advantages to disadvantages, the net value added.

More about the method at <https://uscale.digital/unsere-leistungen-pmf/>

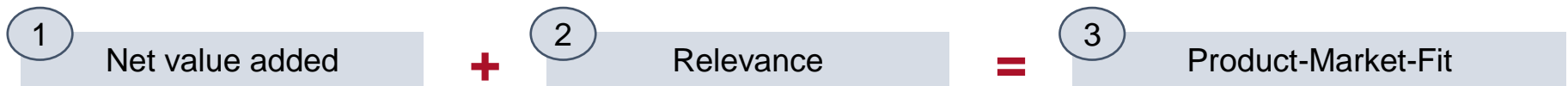
Evaluate advantages (gains) and disadvantages (pains) → Determine net value added



Preliminary remarks on the method

Determination of the product-market fit

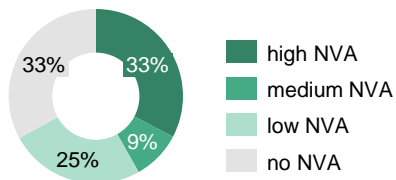
The product-market fit is calculated from the net value added and the relevance.



Question:

"To summarise, how highly do you personally rate the advantages / disadvantages of the service presented?"

Result:

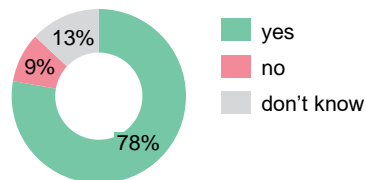


(Method: calculation via Pain-Gain-Index, see previous page)

Question:

"What do you think? Would you personally consider using the service presented?"

Result:

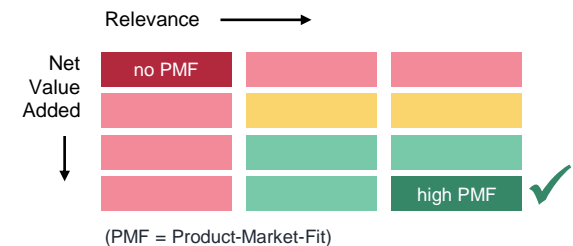


(Example: personal use case given / not given)

Calculation:

Correlation from Net value added and Relevance

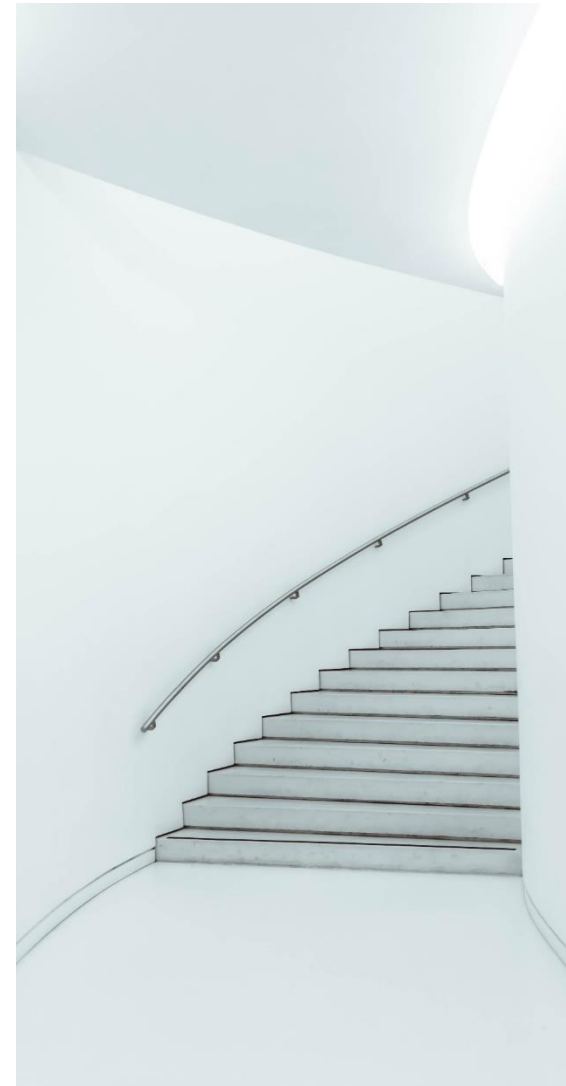
Result: Reachable target groups



(Reachable target group depends on the user segments or different markets)

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Sample

Gender and age

Electromobility as a (still) predominantly male domain.

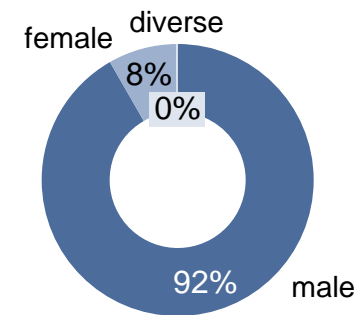
The e-car drivers surveyed are predominantly male. At 8%, the proportion of women is still well below the 25%* share of female buyers of combustion vehicles.

 The low proportion of women is also due to the predominant recruitment via social media.

The average age of 49 years is on a par with the average age of new car buyers in Germany (47 years), if the holding period of the owners of around 2 years is taken into account.

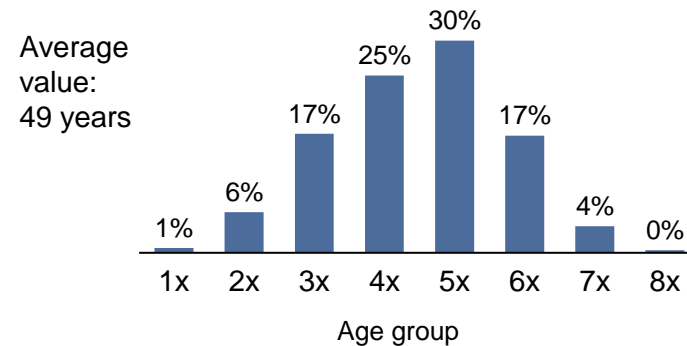
* There is no data on the actual proportion of women among e-car drivers.

"You are...?"



N = 2001

"How old are you?"

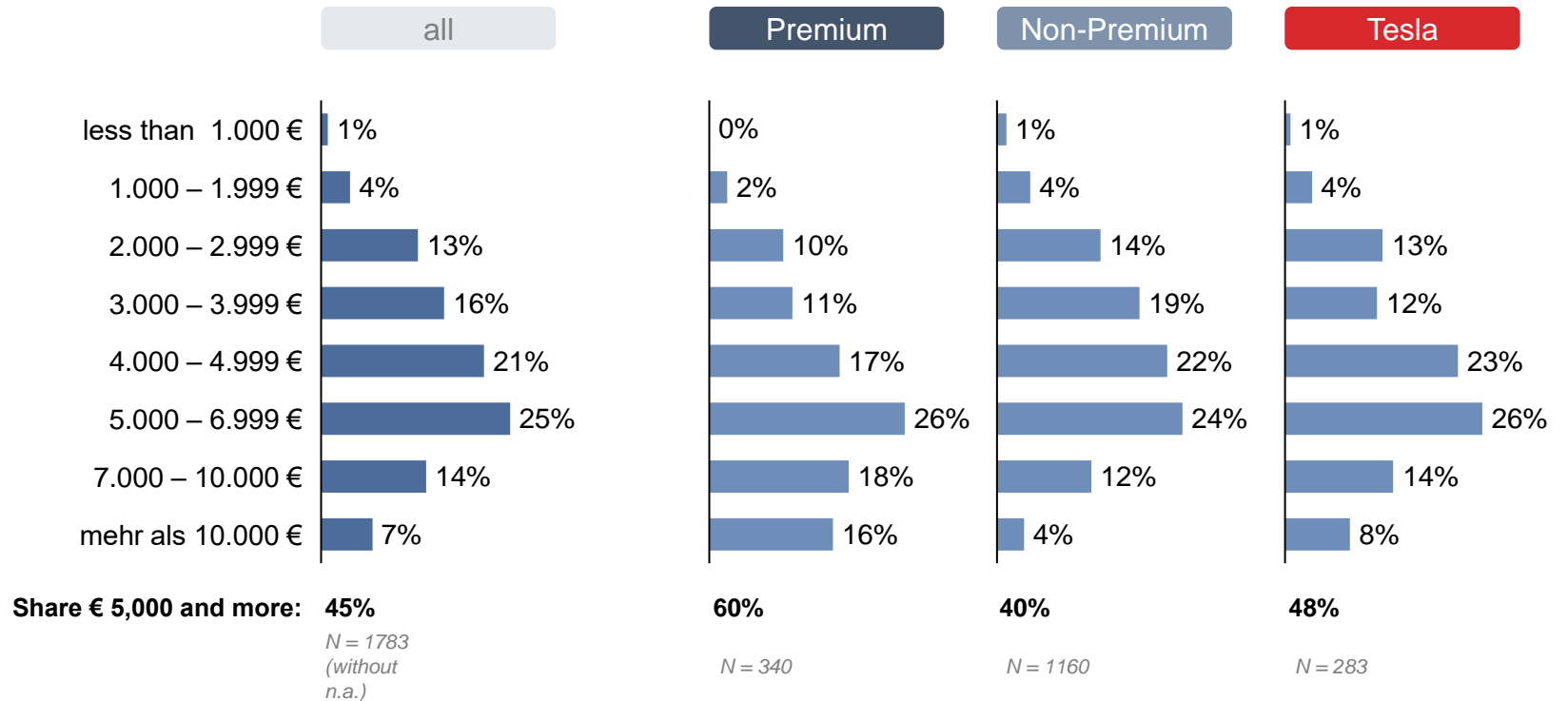


N = 2001

Sample Income

High income of e-car drivers.

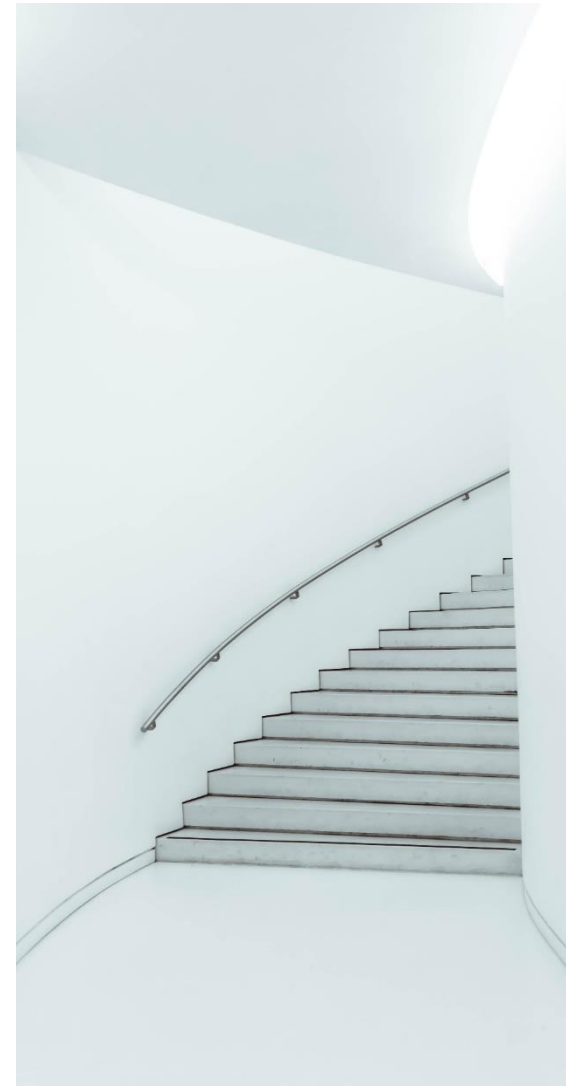
"What is your monthly net household income approximately?"



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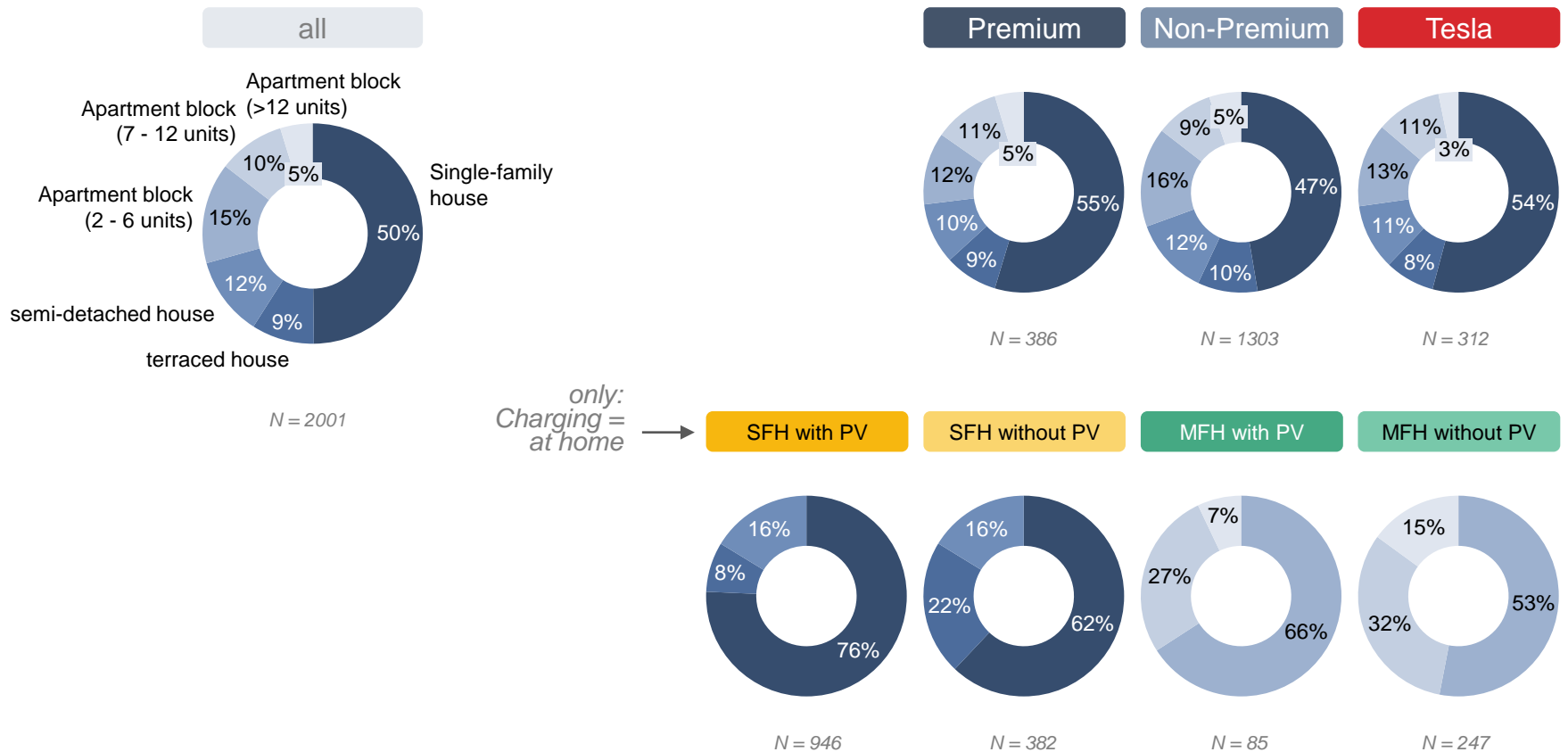


Living situation, driving and charging habits

Housing situation (type of house)

The vast majority of current EV drivers live in single-family homes.

"What kind of house do you live in?"

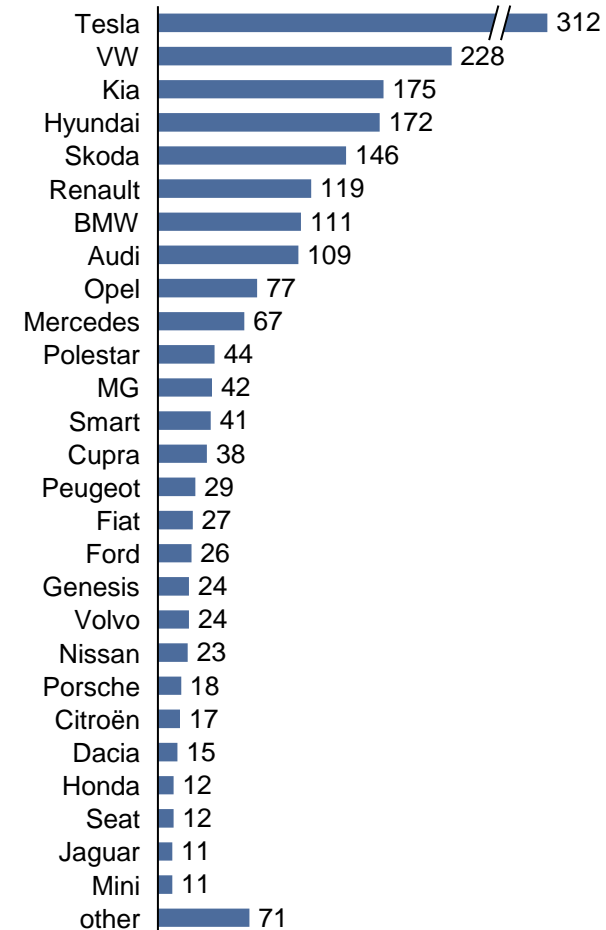


Living situation, driving and charging habits

Brands

All relevant brands included in the study. The brand distribution follows the slowly increasing model range of e-vehicles in the market.

"What kind of e-car do you have (brand)?"



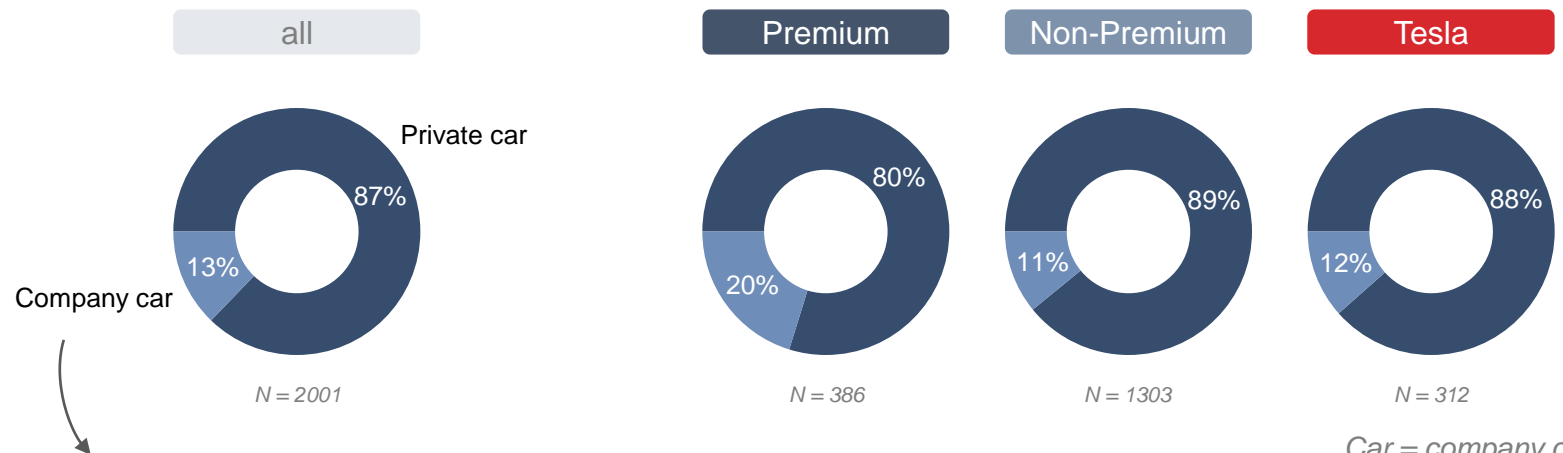
N = 2001

Living situation, driving and charging habits

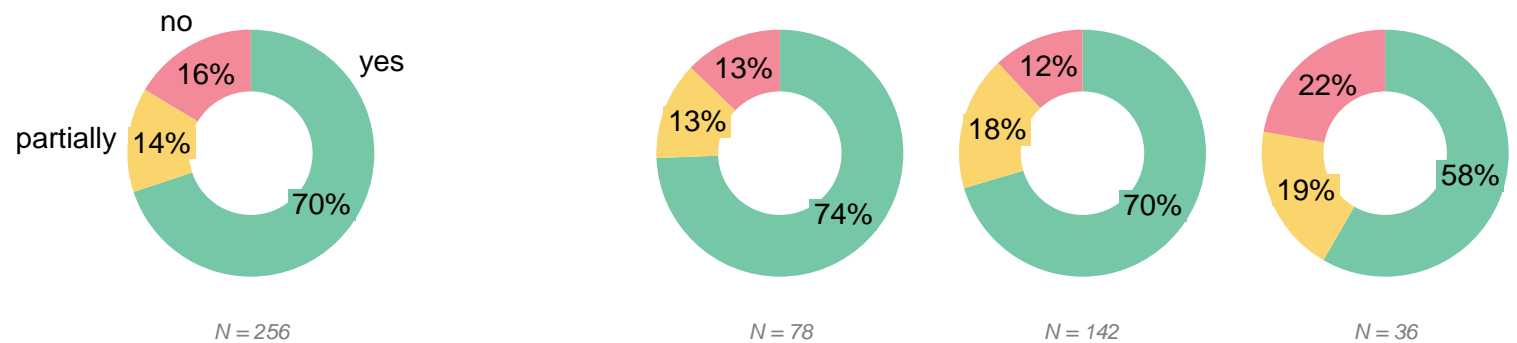
Company car

So far, only one in seven people drive a company car. For two thirds of these, the employer covers the costs of charging electricity.

"Is your [brand] a company car?"



*Car = company car:
"Does your employer cover the cost of the charging current?"*



Living situation, driving and charging habits

Charging locations

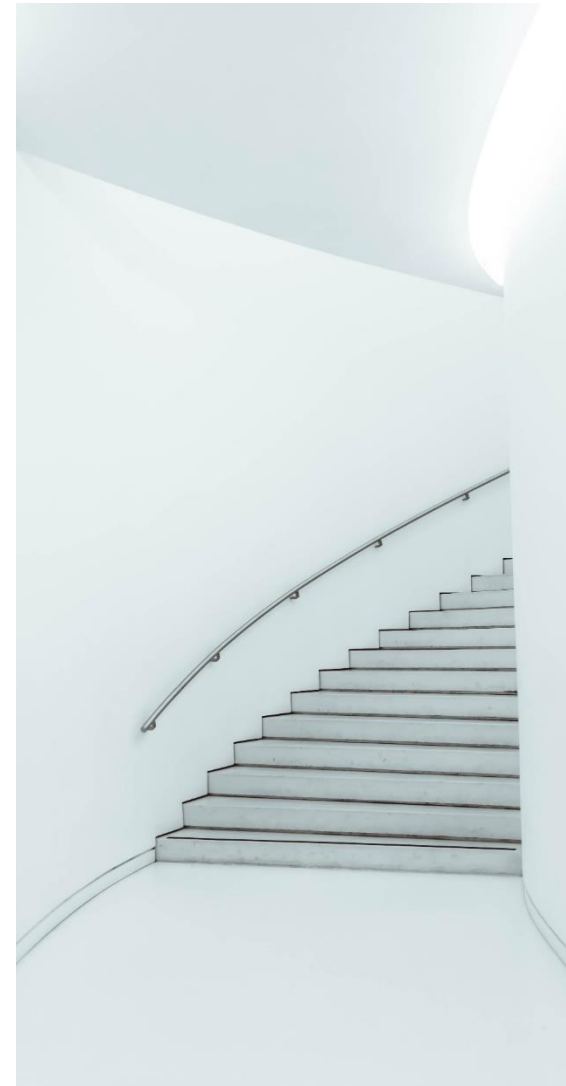
The vast majority of respondents charge at home. However, many people also use all public charging points.

"Where do you charge your [brand + model]?"



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Variable tariffs for charging at public

Opinion on the future of tariffs

12% want dynamic prices. This contrasts with 42% who want simple, standardized and transparent tariffs.
A quarter think that tariffs are simply too high.

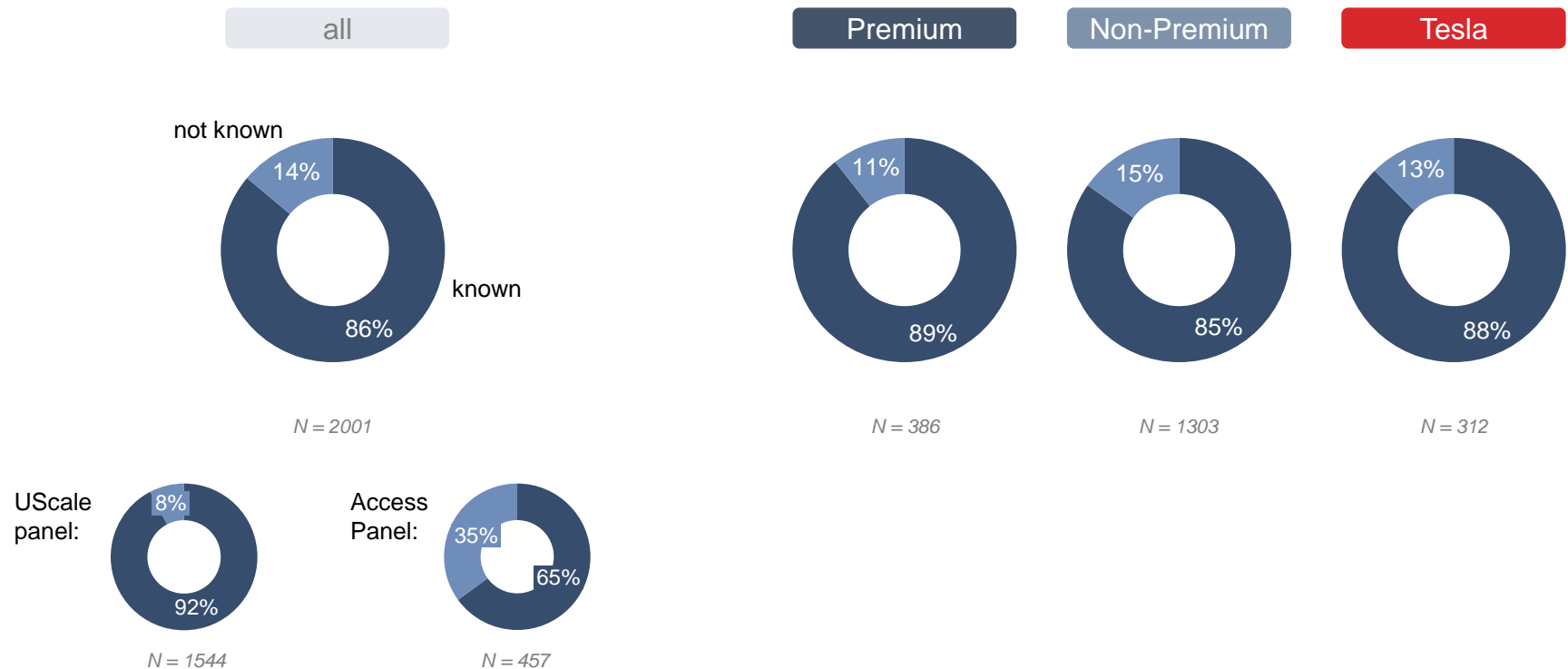
*"What do you generally think about charging tariffs and tariff structures?
Where do you think the journey should go?"*



Variable tariffs for charging at public Awareness Variable tariffs

High awareness of variable tariffs among all brand groups. The majority of less tech-savvy Access panellists are also aware of variable tariffs.

"Energy suppliers and charging station operators are considering offering more variable, i.e. dynamic, tariffs. Variable tariffs are available for home and public charging. Have you ever heard of it?"



Variable tariffs for charging at public Utilisation drivers

High approval rates for numerous possible advantages of charging at public with variable tariffs.

"Which of the following advantages are relevant from your point of view?"
(multiple answers possible)



Variable tariffs for charging at public

Most important usage driver

The financial advantage also dominates in the case of charging at public with variable tariffs. But the other aspects also help with successful marketing

"What would be the biggest advantage of variable tariffs for you personally?"



Variable tariffs for charging at public

Utilisation barriers

Compared to variable tariffs at home, respondents see more disadvantages to variable tariffs when charging at public.

*"Which of the following disadvantages are relevant from your point of view?"
(multiple answers possible)*



Variable tariffs for charging at public

Biggest utilisation barrier

Similar to variable tariffs at home, the risk of higher costs dominates. However, numerous other barriers must be overcome for successful marketing

"What would be the biggest disadvantage of variable tariffs for you personally?"



Variable tariffs for charging at public

Net value added *

At 17%, the proportion of respondents who believe that variable tariffs for charging at public charging stations offer high added value is very low.

ratio (advantages / disadvantages):
 "To summarise, how would you personally rate the advantages / disadvantages of variable tariffs in (semi-)public spaces?"

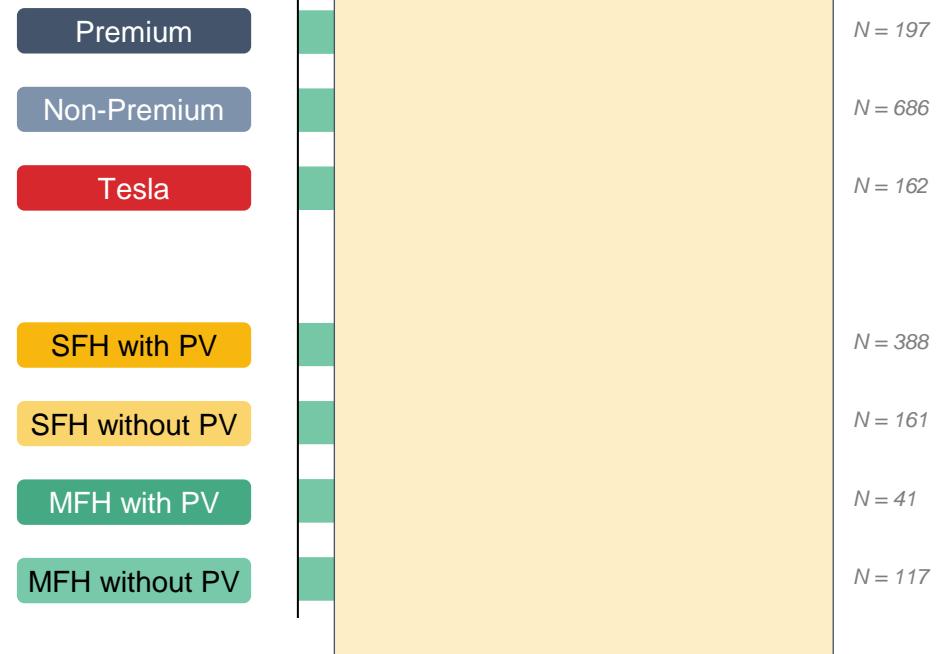


* for method see chapter 2

Variable tariffs for charging at public Relevance *

Although a good two-thirds of variable tariffs for charging at public would in principle be an option,...

"Would variable tariffs (charging at public) be an option for you in principle?"



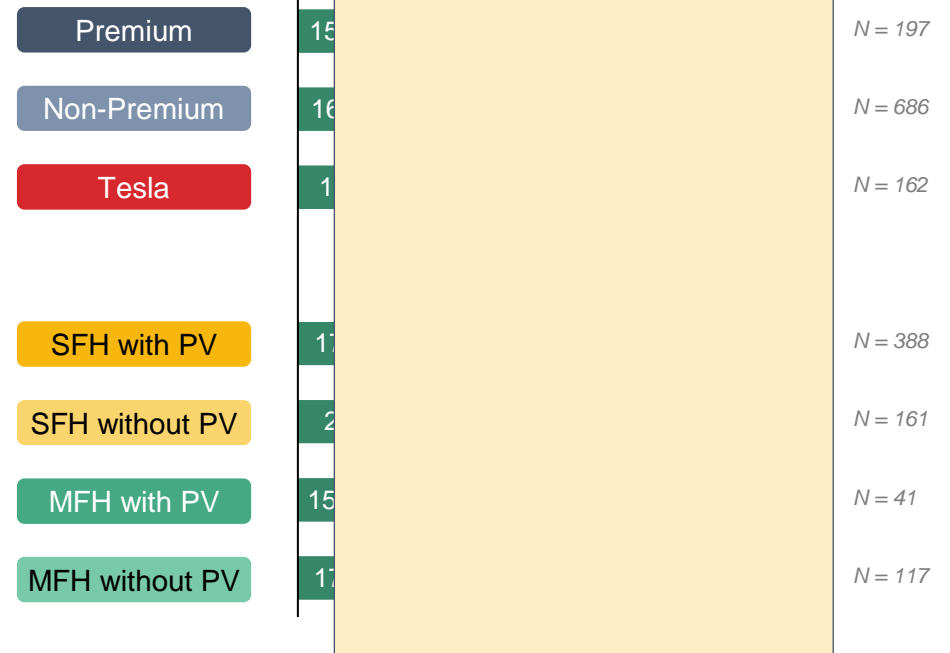
* for method see chapter 2

Variable tariffs for charging at public

Product-Market-Fit *

(Blurred text describing the methodology or context of the study)

(Calculation of the product-market fit from net value added and relevance)



* for method see chapter 2

Variable tariffs for charging at public

Realisation variants

Variable Tarife in Abhängigkeit vom Ortswahl erfahren die größte Zustimmung

"There are many different options for implementing variable tariffs.
Even if this is not an option for you: What do you think of the following options?"

The kWh price fluctuates depending on...



Variable tariffs for charging at public

Necessary price spread

Die Präsentation zum Standardtarif ist nur 10 Tage nach
 dem Ende der Standardtarifperiode zu beenden. Die Präsentation ist
 für die Standardtarifperiode zu beenden.

Variable tariffs (for charging at public) is basically an option = yes:
 "How many cent less would the lower price have to be than the standard rate to make it worthwhile for you?
 Difference in cent:"



Variable tariffs for charging at public

Price display

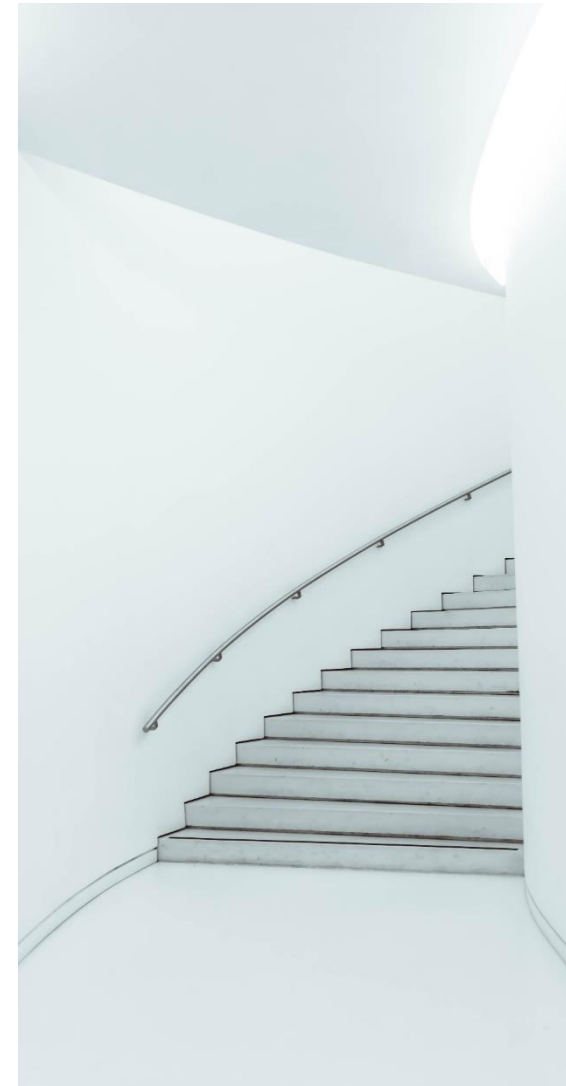
Blurred text describing the survey methodology and objectives.

Charging location = public:
 "Where should operators ideally display where cheap electricity is available and when?"
 (multiple answers possible)



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Preliminary remarks on the method

Determination of "willingness to pay"

Two methods are commonly used to determine willingness to pay, which were combined in the study.

Step 1: van Westendorp method

(first 50% of the sample)

The Van Westendorp method openly queries price points at which potential customers consider an offer to be too expensive, acceptable or too low. In the smart charging study, three price points were surveyed based on the method:

"In your view, what compensation per kWh drawn (in cent) would be...

- *...in any case too low to take part?*
- *...an ideal price, but probably unrealistic?*
- *...a fair and realistic price?"*

Step 2: Gabor-Granger method

(second 50% of the sample)

The Gabor-Granger method asks about the willingness to buy for specific prices. In the smart charging study, 5 price points were selected. The starting point was determined in step 1:

1. *"How much would your supplier have to pay for you to accept [...] offer? At [median of the fair offer from van-Westendorp], would you be prepared to accept a corresponding offer?"*
2. Questions 2 to 5 depending on the previous answers:
 - If yes: *"Would you still be prepared to accept a corresponding offer if [lower offer] were made?"*
 - If no: *"Would you also be prepared to accept a corresponding offer for [higher offer]?"*

Necessary incentivisation Vehicle-to-Grid

Lending use case: Compensation

"Let's assume one kWh costs -.30 cents.
 When you lend energy from your car to the
 supplier and get the same energy back a
 few hours later:
 What compensation per borrowed kWh (in
 cent) would be in your view..."



Necessary incentivisation Vehicle-to-Grid

Lending use case: Reachable target group

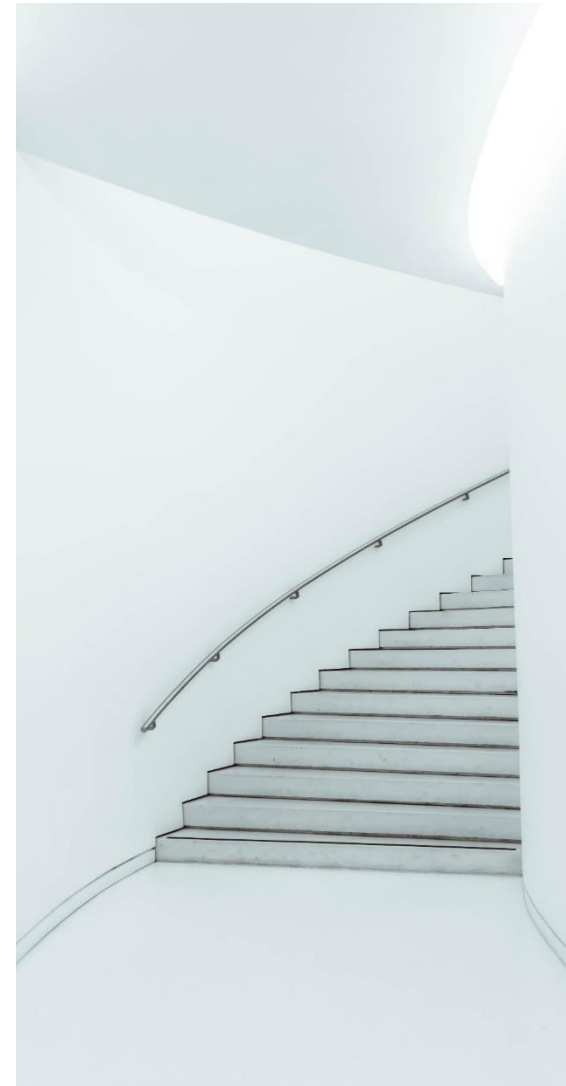
Jenseits von 10 Cent/kWh steigt die erreichbare Zielgruppe nicht mehr nennenswert. Unter 10 Cent fällt sie rapide ab. PV-Anlagenbesitzer mit höherer Zustimmung.

"To lend energy:
How much would your supplier have to pay for a kWh withdrawn and later recharged for you to accept a corresponding offer?
Would you be prepared to offset 10 cent / kWh?"



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Realisation V2H

Important aspects when choosing a provider (1/2)

Wichtigste Aspekte sind der „technische Fit“, die Bedienbarkeit (UX) und die Zukunftsfähigkeit des Systems.

"What aspects would be important to you when choosing the right partner?"
(multiple answers possible)



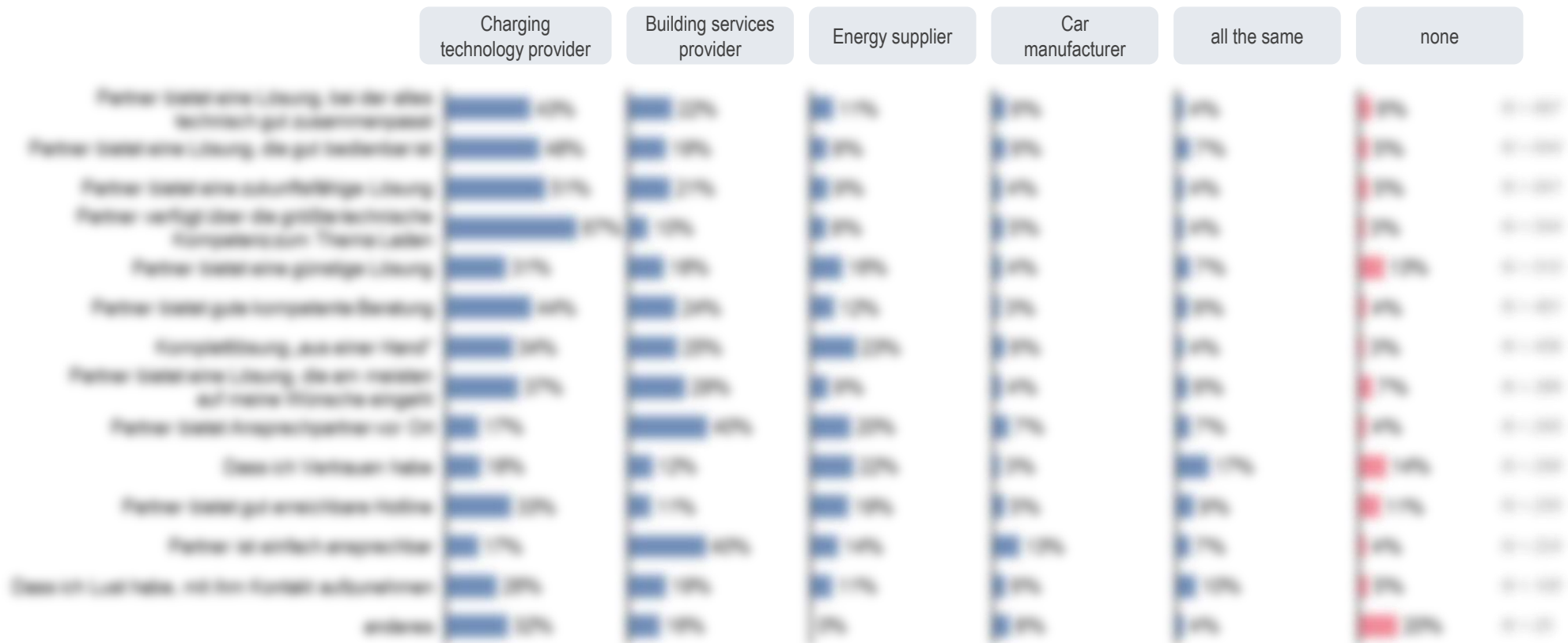
Realisation V2H

Trust in supplier groups

Lebetechnik- und Haustechnik-Arbeiter genannt bei den meisten Aspekten des mit Abstand größten Vertrauens.

"For an integrated solution at home:

Which provider do you think is most likely to fulfil your requirements?"



Realisation V2H

Preferred partner for "everything from a single source"

Procedure = "Everything from a single source":

"If you were to order everything from a single source:

Who would come into question?"

Lieferanten-Anteile gemessen durchgängig der höchsten Präferenz.



About UScale

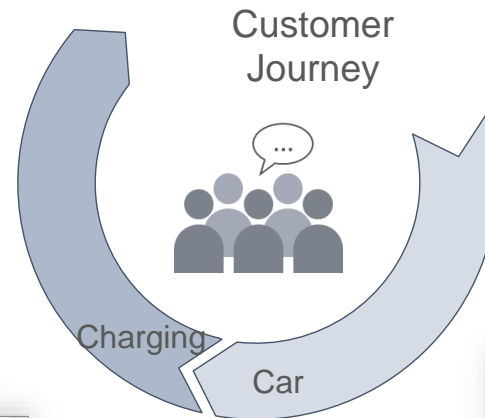
- UScale advises automobile manufacturers, energy suppliers and service providers on the customer-orientated design of offers and the development of KPI systems for customer perception.
- UScale's work is based on a development framework for product-market fit for digital and innovative products and customer insights studies on all touchpoints of the e-mobile customer journey.



- UScale is the only provider of a panel specialising in eMobility with over 9,000 panellists in German-speaking countries.
- UScale makes the customer perspective tangible for managers, engineers and IT experts.
- UScale has extensive industry knowledge of the eMobility ecosystem.
- UScale combines extensive experience with the challenges of corporates with the agility of a start-up.

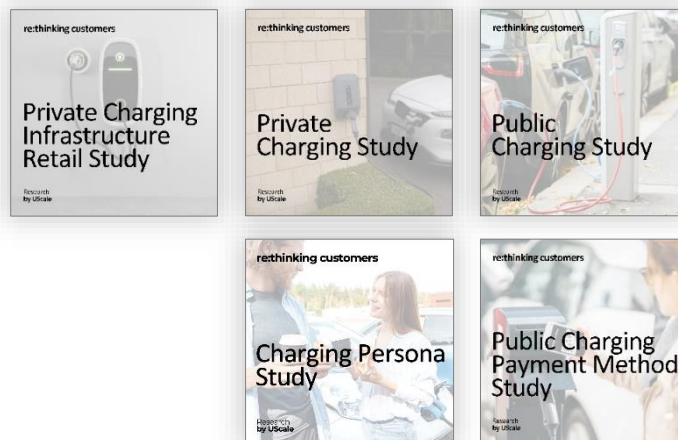
UScale focus studies

Business models



Buying and driving

charging





SCALE YOUR USER
SCALE YOUR BUSINESS



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